Claims:

1. An illumination system for microlithography, especially for wavelengths ≤ 193 nm, especially preferably for EUV lithography for illuminating a field in a field plane with at least one optical integrator which splits a light bundle emitted by a light source into a plurality of light channels each having a light intensity,
characterized in that
a filter is provided in the light path from the light source to the field plane, with the filter comprising filter elements which are configured in such a way that the light intensity of at least one light channel is reduced in the light path after the filter element.

2. The illumination system as claimed in claim 1, characterized in that a reduction of the light intensity of the at least one light channel after the filter element is within > 0 and < 100% of the light intensity of the respective light channel before the filter element.

3. The illumination system as claimed in claim 2, characterized in that a reduction of the light intensity of the at least one light channel after the filter element is within > 25% and < 80% of the light intensity of the respective light channel before the filter element.

4. The illumination system as claimed in one of the claims 2 to 3, characterized in that the at least one light channel illuminates a surface of the filter element and that the filter element is arranged such that the reduction of the light intensity is different at different places of the illuminated surface.

5. The illumination system as claimed in one of the claims 2 to 3, characterized in that the at least one light channel illuminates a surface of

the filter element and the filter element is arranged such that the reduction of the light intensity is the same at different places of the illuminated surface.

6. The illumination system as claimed in one of the claims 1 to 5, characterized in that for reducing the light intensity of at least one light channel, the filter element comprises a transmission filter element associated with the light channel.

7. The illumination system as claimed in one of the claims 1 to 5, characterized in that the filter element for reducing the light intensity of at least one light channel comprises a reflective optical component which is associated with said light channel and comprises a reflectivity adjusted to the reduction.

8. The illumination system as claimed in one of the claim 1 to 6, characterized in that the transmission filter associated with the light channel is a variable neutral grey filter.

9. The illumination system as claimed in claim 7, characterized in that the neutral grey filter comprises a variable line and/or point density, so that the grey scale values of the neutral grey filter can be set by the line and/or point density.

10. The illumination system as claimed in one of the claims 1 to 9, characterized in that the filter element for reducing the light intensity of at least one light channel comprises a diaphragm associated with the light channel.

11. The illumination system for microlithography, especially with wavelengths ≤ 193 nm, especially preferably for EUV lithography for illuminating a field in a field plane with at least one optical integrator, at least one optical

component which is arranged in the light path from a light source to the field plane to be illuminated between the optical integrator and the field plane to be illuminated, characterized in that the optical component is sufficiently corrected in an aplanatic way and the illumination system comprises at least a filter element which is configured and arranged in such a way that a substantially homogeneous illumination of the field in the field plane is achieved.

12. The illumination system as claimed in claim 11, characterized in that the optical component is corrected in an aplanatic way such that in the field plane the σ variation is less than 10%, especially preferably less than 2%.

13. The illumination system as claimed in one of the claims 1 to 12, characterized in that the field is a ring field with a radial and azimuthal extension.

14. The illumination system as claimed in claim 13, characterized in that the optical element comprises at least a field forming optical component and the optical component is sufficiently corrected in an aplanatic way at least in the radial alignment of the pupil image.

15. The illumination system as claimed in one of the claims 1 to 14, characterized in that the filter element is arranged in the light path from the light source to the field plane close to the optical integrator as a separate component, or is integrated in the optical integrator.

16. The illumination system as claimed in one of the claims 1 to 14, characterized in that the filter element is arranged in the light path from the light source to the field plane in front of and close to the optical integrator.

17. The illumination system as claimed in one of the claims 1 to 14, characterized in that the filter element is arranged in the light path from the

light source to the field plane after and close to the optical integrator.

18. The illumination system as claimed in one of the claims 1 to 17, characterized in that the optical integrator comprises at least a first optical element with a plurality of first raster elements.

19. The illumination system as claimed in claim 18, characterized in that the optical integrator comprises a second optical element with a plurality of second raster elements.

20. The illumination system as claimed in claim 18, characterized in that a filter with a plurality of filter elements is arranged in the light path from the light source to the field plane between the first optical element with a plurality of a first raster elements and the second optical element with a plurality of second optical raster elements.

21. The illumination system as claimed in one of the claims 11 to 20, characterized in that the filter element is a transmittive filter element with variable transmission.

22. The illumination system as claimed in one of the claims 11 to 20, characterized in that the filter element is a reflective filter element with variable reflectivity.

23. The illumination system as claimed in one of the claims 21 to 22, characterized in that the filter element is a variable neutral grey filter.

24. The illumination system as claimed in claim 23, characterized in that the neutral grey filter comprises a variable line and/or point density, so that the grey values of the neutral grey filter can be set through the line and/or point density.

25. The illumination system as claimed in one of the claims 1 to 24, characterized in that the filter element is exchangeable.

26. A projection exposure system for microlithography for wavelengths ≤ 193 nm, especially for EUV microlithography, with a light source, an illumination system as claimed in one of the claims 1 to 25 for illuminating a field in a field plane, a projective objective for projecting an object arranged in the field plane into an image in an image plane.

27. A scanner type projection exposure system for microlithography for wavelengths ≤ 193 nm, especially for EUV microlithography, with
a light source,
an illumination system wherein the illumination system is comprising;
at least one optical integrator;
at least one optical element which is arranged in the light path from the light source to a field plane to be illuminated between an optical integrator and a field plane to be illuminated, with a field being illuminated in the field plane which has an extension in a scanning direction and an illumination intensity perpendicular to the scanning direction,
wherein the optical element is sufficiently corrected in an aplanatic way and a plurality of filter elements which are configured and arranged in such a way that a substantially homogeneous illumination of the field in the field plane perpendicular to the scanning direction is achieved, so that the uniformity errors of the scanning energy in the field plane are less than ± 3%, preferably less than than ± 1%, especially preferably less than 0.5%, with the scanning energy being the illumination intensity of the field integrated in the scanning direction
and
a projection objective for projecting an object arranged in the field plane into an image in the image plane.

28. A method for producing micro-structured components by using a projection exposure system as claimed in one of the claims 26 to 27.